Claims

What is claimed is:

1. A fuel booster operable to compress a combustible fuel, the fuel booster comprising:

a compressor housing;

a compressor rotor;

a seal assembly coupled to the compressor housing, the seal assembly and the compressor housing cooperating to at least partially define a hermetically sealed compressor chamber;

a motor housing coupled to the seal assembly, the motor housing and the seal assembly cooperating to at least partially define a motor chamber that is sealed from the compressor chamber to prevent fluid flow therebetween; and

a motor including a motor rotor and a motor stator, the motor rotor and the compressor rotor contained within the compressor chamber, the motor rotor including a cylindrical surface, the motor stator substantially surrounding the cylindrical surface and contained within the motor chamber.

2. The fuel booster of claim 1, wherein the compressor housing includes a fuel inlet aperture and a fuel outlet aperture.

3. The fuel booster of claim 1, wherein the compressor rotor is a first compressor rotor, the fuel booster further comprising a second compressor rotor engaged with the first compressor rotor, the first compressor rotor and the second compressor rotor contained within the compressor chamber.

4. The fuel booster of claim 1, wherein the compressor rotor includes a drive portion that extends into the motor stator, and wherein the motor rotor includes an annular sleeve connected to the drive portion.

5. The fuel booster of claim 1, wherein the seal assembly includes a canister sized to cover the motor rotor and contact the compressor housing.

6. The fuel booster of claim 5, wherein the seal assembly includes an O-ring positioned between the canister and the compressor housing.

7. The fuel booster of claim 6, wherein the O-ring is compressed between the motor housing and the compressor housing when said housings are interconnected.

8. The fuel booster of claim 1, wherein the compressor housing includes an adapter plate connected to the motor housing.

9. The fuel booster of claim 1, wherein the compressor housing includes a discharge housing, the discharge housing receiving a flow of high-pressure fuel from the compressor rotor and discharging the high-pressure fuel flow to a combustor.

10. The fuel booster of claim 1, further comprising a variable frequency drive operable to drive the motor at a desired speed.

11. The fuel booster of claim 1, further comprising a cooling fan motor operable to drive a cooling fan independent of the motor to cool the motor.

12. A microturbine engine comprising:

a compressor operable to produce a flow of compressed air;

a recuperator in fluid communication with the compressor to receive the flow of compressed air, the flow of compressed air being preheated within the recuperator to produce a flow of preheated compressed air;

a fuel booster including a motor, a compressor assembly, a seal assembly, a compressor housing, and a motor housing, the seal assembly coupled to the motor housing to at least partially define therebetween a motor chamber and the seal assembly coupled to the compressor housing to at least partially define therebetween a compressor chamber, the compressor chamber being substantially hermetically isolated from the motor chamber by the seal assembly and containing the compressor assembly, the motor including a motor rotor and a motor stator, the motor rotor contained within the compressor chamber, and the motor stator contained within the motor chamber, wherein the motor drives the compressor assembly to produce a flow of compressed fuel;

a combustor receiving the flow of preheated compressed air from the recuperator and the flow of compressed fuel from the fuel booster, the combustor combusting the flow of preheated compressed air and the flow of compressed fuel to produce a flow of products of combustion;

a power turbine driven by the flow of products of combustion from the combustor;

a sensor operable to measure an engine parameter; and

a motor drive operable to vary the speed of the motor to maintain the engine parameter at a desired value.

13. The microturbine engine of claim 12, wherein the compressor housing includes a fuel inlet aperture adapted to receive low-pressure fuel, and a fuel outlet aperture for directing the flow of compressed fuel out of the compressor housing.

14. The microturbine engine of claim 12, wherein the compressor assembly includes a first compressor rotor and a second compressor rotor engaged with the first compressor rotor, the first compressor rotor and the second compressor rotor at least partially supported for rotation by the compressor housing and contained within the compressor chamber.

15. The microturbine engine of claim 14, wherein the first compressor rotor includes a drive portion that extends into the motor stator, and wherein the motor rotor includes an annular sleeve connected to the drive portion.

16. The microturbine engine of claim 12, wherein the seal assembly includes a canister sized to cover the motor rotor and contact the compressor housing.

17. The microturbine engine of claim 16, wherein the seal assembly includes an O-ring positioned between the canister and the compressor housing.

18. The microturbine engine of claim 17, wherein the O-ring is compressed between the motor housing and the compressor housing when said housings are interconnected.

19. The microturbine engine of claim 12, wherein the compressor housing includes an adapter plate connected to the motor housing.

20. The microturbine engine of claim 12, wherein the compressor housing includes a discharge housing, the discharge housing receiving the flow of compressed fuel from the compressor rotor and discharging the flow of compressed fuel to the combustor.

21. The microturbine engine of claim 12, wherein the motor drive is a variable frequency drive.

22. The microturbine engine of claim 21, wherein the sensor measures a fuel pressure, the variable frequency drive adjusting the desired speed in response to the fuel pressure.

23. The microturbine engine of claim 21, wherein the sensor measures an engine temperature, the variable frequency drive adjusting the desired speed in response to the engine temperature.

24. The microturbine engine of claim 12, further comprising a cooling fan motor operable to drive a cooling fan independent of the motor to cool the motor.

25. A method of providing combustible fuel to an engine to achieve a desired engine parameter, the method comprising:

interconnecting a compressor housing, a motor housing, and a seal assembly to produce a compressor chamber and a motor chamber;

substantially hermetically isolating the compressor chamber from the motor chamber with the seal assembly;

supporting a compressor rotor and a motor rotor for rotation within the compressor chamber;

supporting a motor stator within the motor chamber;

providing power to the motor stator to rotate the compressor rotor at a speed;

measuring the engine parameter; and

adjusting the power provided to the motor stator to adjust the compressor rotor speed in response to the measured engine parameter.

26. The method of claim 25, wherein adjusting the power includes varying the frequency of the power provided to the motor stator.

27. The method of claim 25, wherein the engine parameter is a fuel pressure.

28. The method of claim 25, wherein the engine parameter is a temperature.